Agricultural Research Service

PROGRAM/PROJECT MANAGEMENT BUSINESS AREA ANALYSIS

Prepared for:
The ARS Information Technology Management Steering Committee
August, 1998

Executive Summary

This report presents the results of the Agricultural Research Service (ARS) Program/Project Management Business Area Analysis (BAA) project. This project management BAA project was established to develop a conceptual framework of the processes and information required to manage agency programs, research projects, and resources. This framework identifies ways to improve those processes and is the basis for requirements for a new and integrated program and research management information system.

Dr. Ric Dunkle, Midwest Area Director, and David Rust, Program Planning Advisor for the National Program Staff, served as co-executive sponsors. Jennifer Clouse, computer specialist in the Information Technology Division, organized and led the project. Nineteen ARS program staff provided their insights, knowledge, and experience on program/project management strategies and processes.

The objectives of the project were to:

- Examine and redefine processes in need of re-engineering or improvement/modernization
- Develop a broadly focused (or coarse grain) model of the business area
- Develop business requirements for a new program management system

The scope of the business area was defined in terms of the processes and information relevant to three broad functions:

- Program Management
- Research Project Implementation, and
- Resource Management

The primary results of the Program/Project Management BAA are a set of models characterizing the business purpose and drivers, the functions and processes performed by the organization to achieve that purpose, and the information structure supporting those processes. These models are contained in this report and the accompanying appendicies.

Another product of the effort is a set of recommended next steps for addressing process improvement needs and continuing the process towards a complete enterprise business architecture and developing or acquiring automated systems support that meets the business requirements outlined in the BAA.

The recommended next steps are presented in two categories as follows:

Conceptual Business Model and Process Management

1. Perform process improvements/redesigns for peer review processes, and research agreement processes. Formalize/structure national program planning and review/evaluation processes and resolve outstanding issues about the reporting relationships between national programs and CRIS projects - (5 months)

2. Achieve a broader consensus on the business model concepts and process/information requirements for National Program Planning and Management, Research Project Implementation, and their linkages and effects on Resource Management (budget formulation, resource planning and resource allocation) - (2 months)

3. Implement the agreed-upon business processes through policy direction and training - (One month)

4. Incorporate or expand upon the base business model in areas such as information management, technology transfer, and resource management to integrate in the core program management information system. - (8 months)

Integrated Systems Support

1. Survey existing or commercial systems for possible use or adaptation for ARS. One system that should be examined has been developed by Agriculture Canada - (3 months)

2. Perform Capital Planning and Investment control and project planning for the acquisition or development of a new integrated corporate information system for program management- (2 months)

3. Train and develop ARS technology staff to develop/support the new platform and information system - (ongoing until March 99 and beyond)

4. Acquire or commence develop the new information system. (This task is likely to take longer than one year for full capability and full system implementation.)

Estimated resource requirements for these next steps are $915,520 through March of 2000, including $622,520 of existing resources (in-house salaries) that should be focused on these tasks. The remaining $293,000 is estimated travel/supplies and contractual costs for professional information technology training, consulting and software engineering services. These estimates are rough as the in-house resource usage, time-frames and dollar amounts required for purchasing and implementing a new information system may be significantly different than those that would be required to develop and implement a custom system in-house.

BAA Report Table Of Contents

Introduction

This report presents the results of the Agricultural Research Service (ARS) Program/Project Management Business Area Analysis (BAA) project. The Program/Project Management BAA project was established to develop a conceptual framework of business processes and information required to facilitate effective and more efficient ways of managing agency programs, research projects, and the resources needed to carry them out. This framework is intended to serve as the basis for automated information system requirements of a new and integrated program and research management information system.

Background

The nature of program and project management in ARS is changing with the adoption of the new National Program research system and an increased emphasis on sharing timely, accurate, and relevant information on agency research programs among internal multi-disciplinary teams and to agency customers and stakeholders. At the same time, ARS strives to minimize the administrative burden on scientific staff and reduce the amount of time and effort required to perform routine program administration tasks.

In order to meet the operational challenges brought about by these changes, ARS has recognized that the program management processes, practices and information systems that have been in place for many years must be reassessed, redesigned, and modernized.

Program Management and Information Technology

Information technology plays an important role in accomplishing and implementing a new and improved way of doing program and project management. Current mission-critical and support systems are encroached with old requirements and even older technology that hinders the Agency's ability to move forward and progress through a changing business environment. Key systems are programmed in outdated database software and run on technical platforms that are obsolete and increasingly more difficult to manage and maintain. Old computer technology and legacy systems such as the Research Management Information and the Annual Resource Management Planning System must be replaced with modern and maintainable integrated systems that meet new business management requirements.

Concurrently, the Department of Agriculture, Congress and the Office of Management and Budget now call for agencies to have an information technology program and investment strategy that is based upon the strategic and mission-critical requirements and thrusts of the Agency, is grounded in an enterprise business and technology architecture, and is consistent with emerging Departmental architectures and standards. These pressures further compel ARS to take definitive and appropriate

action towards defining the core business of the Agency in a business architecture and to deliver modernized and streamlined processes and information systems.

The ARS ITMSC and the Program/Project Management BAA Project

In early 1997 the ARS Information Technology Management Steering Committee (ITMSC) was formed to assess the overall information technology management program of ARS and identify and prioritize specific needs and issues to address in improving the program. The steering committee commissioned and funded project teams to address six critical needs in ARS information technology management. One of the seven projects initiated was the Program/Project Management BAA, a developmental process to analyze and establish updated requirements and a conceptual design for a modernized and integrated business system to support the program and resource management functions of the agency.

The steering committee designated Dr. Ric Dunkle, Director of the ARS Midwest Area, and Mr. David Rust, Program Planning Advisor to the Deputy Administrator of the National Program Staff as co-executive sponsors of the Program/Project Management BAA to champion the project and Jennifer Clouse of the Information Technology Division to organize and lead the effort. Dr. Dunkle and Mr. Rust selected several experienced and forward-thinking program and resource management staff to serve on the project team.

Project Design and Objectives

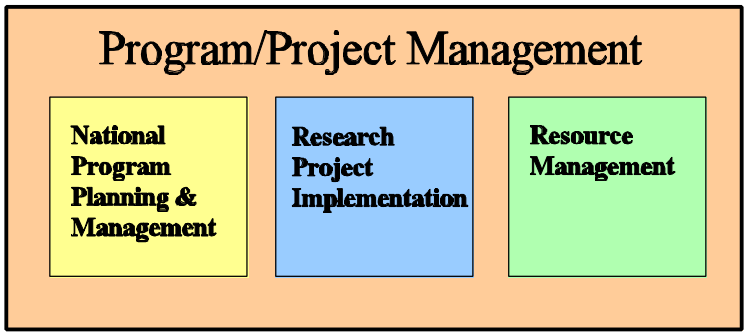
Program/Project Management BAA Objectives

- **To examine and redefine processes in need of re-engineering or improvement/modernization**
- **To develop a broadly-focused (or coarse grain) model of the business area, and**
- **To develop business requirements for a new program management system**

The Program/Project Management BAA project approach was designed to couple strategic business requirements analysis for the program/project management business area (a set of functions, processes and information requirements supporting those processes) with structured analysis of business requirements for the redesign of a new program management information system. Executed in two phases, the project design entailed defining the core business of program management as it needs to be in the new business environment by developing a high level business architecture model (Phase One) and then further developing that model into more detail for processes and data targeted to be supported by a new program management system (Phase Two.)

Project Scope

The scope of the business area was defined in terms of the processes and information relevant to three broad functions, **Program Management** (National Programs), **Research Project Implementation**, and **Resource Management** (including budget formulation, resource allocation, and resource management planning.)



Project Process

The Phase One project team assembled in December 1997 to kick-off the effort, and subsequently met for three facilitated workshops in Beltsville, MD between February to July 1998 to develop the high-level business model of processes and information needs. For Phase Two, the majority of Phase One team members continued in their participation, and the team was extended to include several new members to provide additional functional expertise and experience. The facilitation and support team recorded and developed the project products from the team's workshop materials.

Methods

As the name suggests, the project was planned and executed as an abbreviated type of business area analysis - a method used to design and model a cohesive business system.

Business Area Analysis Method Objectives

- **Provide a clear understanding of the business and how its activities interrelate**
- **Provide an architectural framework for the building of systems in an information-based enterprise**
- **Provide a framework such that separately built systems will work together**
- **Trigger the rethinking of procedures in the enterprise so that they are as efficient as possible using modern technology**
- **Identify requirements of highest priority**

A business area analysis is usually performed for the purpose of communicating the rules and requirements of a business system to those responsible for providing automated support to that business. A glossary of methodology-related terms is included as Appendix D.

Using analytical and modeling techniques common in the systems engineering industry, the Program/Project Management BAA entailed developing process and information models captured in a computer-aided software engineering (CASE) tool. These models can be further defined for the purpose of information system design. The conceptual (or business -view) models of processes and data can then be translated into logical models to be implemented in a computer system (see figure 1.) The project core team also developed basic representations of Program/Project Management data for use by internal and contractual technical staff in developing a new information system.

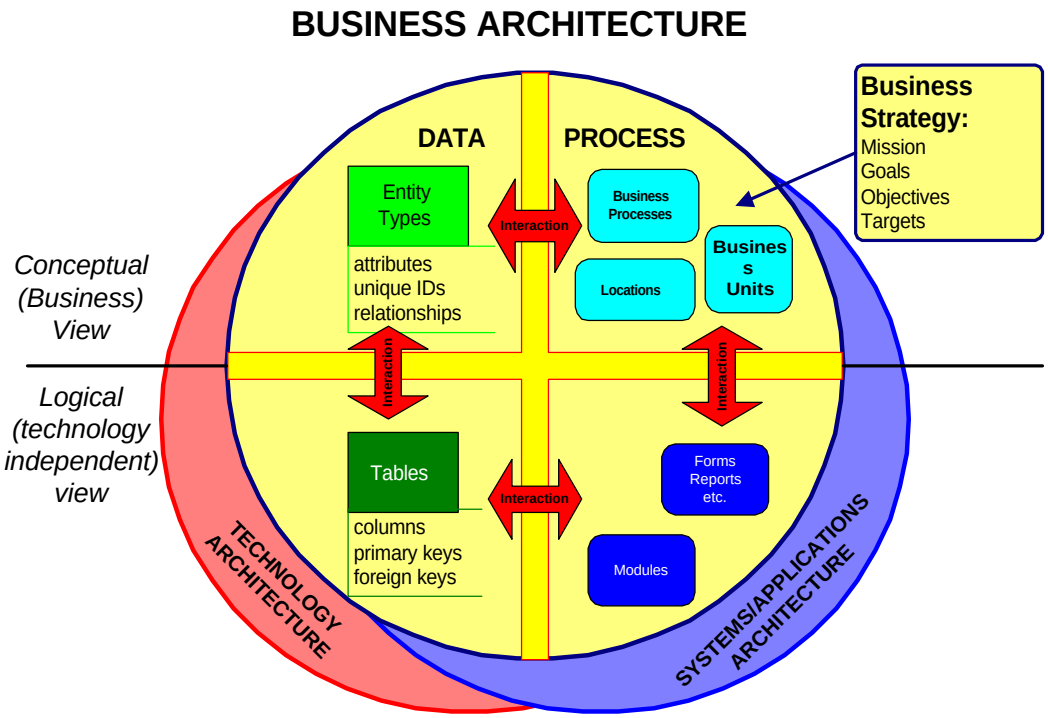


Figure 1

Project Team

The following individuals participated in full or in part in the Program/Project Management BAA:

Project Management Team

Dr. Ric Dunkle, Director, MWA, Co-Executive Sponsor
David Rust, Program Planning Advisor, NPS, Co-Executive Sponsor
Jennifer Clouse, Computer Specialist, AFM-ITD, Project Leader

Participants

Patricia Bothast, Program Analyst, MWA
Dr. Al Dedrick, Associate Deputy Administrator, NPS
Dr. Dell Delfosse, National Program Leader, NPS
Pete Lombardo, Computer Specialist, NPS
Steve Helmrich, Director, AFM-FMD
Dr. William Marmer, Research Leader, NAA
Wilda Martinez, Director, NAA
Pamela Mason, Program Analyst, NPS
Kathy Michels, Budget Analyst, OA-BPMS
Jan Overton, Location Administrative Officer, NWA
Debbie Perry, Executive Secretary, SAA
Dr. John Radin, National Program Leader, NPS
Scott Rieland, Computer Specialist, NPS
James Rogers, Budget and Fiscal Officer, NAA
Tonja Socks, Computer Specialist, NPS
Dr. Morse Solomon, Research Leader, BA
Dr. Jean Steiner, Research Leader, SAA
Curtis Wilburn, Grants and Agreements Specialist, AFM-EAD
David Young, Director, AFM-EAD

Facilitation and Support

Connie Cronin, Computer Specialist, AFM-ITD
Erwin Miller, Computer Specialist, AFM-ITD
Jeanne Rector, Management Analyst, AFM-ITD

Project Contact

For more information on the Program/Project Management Business Area Analysis project, please contact Ms. Jennifer Clouse, ARS Information Technology Division at (301) 504-1115.

BAA Results

The primary results of the Program/Project Management BAA effort are a set of models characterizing the business purpose and drivers, the functions and processes performed by the organization to achieve that purpose, and the information structure supporting those processes. Another product of the BAA effort is a set of recommended next steps for addressing process improvement needs and continuing the BAA process towards a complete enterprise business architecture and developing or acquiring automated systems support that meets the business requirements outlined in the BAA models.

The BAA results are organized and presented in the following sections:

- **Business Organization and Direction**
- **Major Processes and Information Requirements**

This section of the BAA report contains the complete model for Business Organization and Direction and a narrative overview of Major Processes and Information Requirements. The full models for Major Processes and Information Requirements can be found in Appendices A, B, and C.

The content of model results was developed by the project team participants. The Next Steps for the effort were developed by Jennifer Clouse and Pamela Mason.

Business Organization and Direction

Team Vision/Mission Statement for Program/Project Management

ARS research program and project management business processes and systems are designed and implemented to effectively and efficiently meet current and projected agency and stakeholder requirements in the generation, development and adaption of new knowledge and technologies.

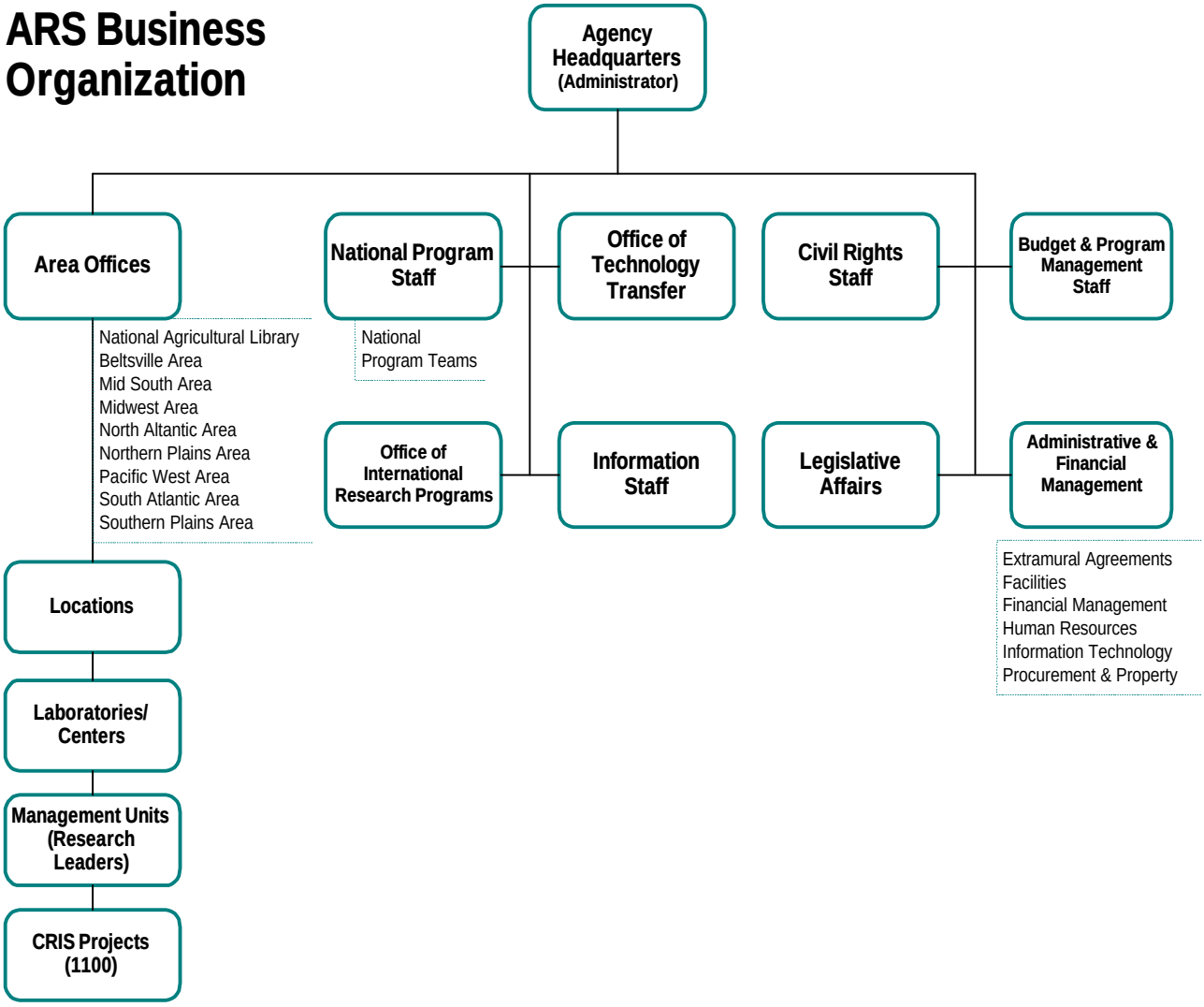
Organizational/Business Purpose

To serve as a vehicle for developing and providing agricultural knowledge, technology, materials, standards, and analysis that solves problems and supports innovation/progress in agricultural approaches and public health for governmental agencies, society, academic institutions, and commercial/private agricultural industries. ARS is expected to provide leadership in agricultural research, for USDA and other organizations. Our job is to maintain interaction with Congress. In doing so, ARS works with customers to develop a vision, identify problems, prioritize efforts, and mobilize resources.

Suppliers, Products/Services, and Customers/Stakeholders

ARS Suppliers	Products/Services	Customers/Stakeholders
Same as Customers and: Cooperators Other countries Vendors/Businesses Other Agencies The President	Problem Solving Knowledge and Technology (processes, practices, equipment, models) Materials: Germ-plasm Genes Micro-organisms Seeds Risk Assessments Chemical Standards	• Food and non-food industry • Other Fed Agencies (FDA, DOE) • Action and Regulatory Agencies (NRCS, APHIS, FAS) • Scientists (internal/external) • Farmers • Commodity Groups • Universities • USDA Secretary

Business Organization



Organizational Roles

Headquarters Staff Offices - Develop policies, provides support for decision making.

Area Offices, Locations, Laboratories, Management Units, Projects - Facilitate excellent research, collaborate and coordinate with external organizations, influence planning processes, supervision (recruitment, hiring, performance evaluations, reviews, training, prioritization, etc.) Between Areas - Coordinate through Administrator's council.

National Program Staff - Identifies problems, allocates resources, ensures program relevance, plans programs, coordinates programs and decides what research is done where.

Administrative and Financial Management - Establishes policy, provides consulting, planning, administrative and technology processing support.

Office of Technology Transfer -

International Research Programs -

Civil Rights -

Budget and Program Management Staff - Establishes policies, procedures, and systems essential to coordinate and effect a comprehensive Federal budgetary program, including the (1) Formulation of the President's budget; (2) Presentation activities to Executive offices and Legislative committees; (3) Execution of budget plans, appropriations and reimbursable accounts; and (4) Review and Reporting of programs, directives, and resources as implemented.

Critical Success Factors

The following are conditions or requirements critical for the success of ARS program management:

- Effective leadership and management team
- Reliable information
- Interrelated information and systems
- Clear problem identification
- A vision of where you are going
- Adequate people, resources, skills
- Competent scientists and technicians
- Appropriate facilities and equipment
- A communication process in place for all users and stakeholders at all levels of the organization.

- An effective way of telling people what we do (the value of what we do) P.R., marketing to ensure audience has a vested interest in agricultural research and issues, understanding of need.
- Compliance with Congressional intent and Federal mandates.
- Understand and be responsive to customer/stakeholder needs
- Deliver quality deliverables (Be the best!)
- A critical mass of scientific discipline
- Effective technology transfer and commercialization of research results
- Empower individuals and foster an environment conducive to creativity
- Get budget approved as submitted to Congress
- Accurate financial reporting and budgetary/financial analysis
- Relevant agency goals and research
- Communicating results effectively
- Build agency capacity

Goals and Strategies

The following are some general goals and strategies for ARS program management:

- State of the Art workforce
  - Quality of life for employees
  - Recruitment, retention, deletion
  - Training, retraining of workforce
  - High employee satisfaction
  - Leadership and management
  - Adequate facilities and equipment
  - Recognition, motivated workforce & rewards
- Effective technology transfer
- All users/stakeholders properly informed and part of process
- ARS properly informed by Stakeholders/customers
- Have interrelated information & systems that are up-to-date/current, accurate, pro-active, flexible. Common databases that users can pull out information for a specific use.
- A standardized (workable, user-friendly, flexible, common agreement) process for capturing, communication and dissemination information- both management and delivery.

Environmental Scan - External/Internal Drivers

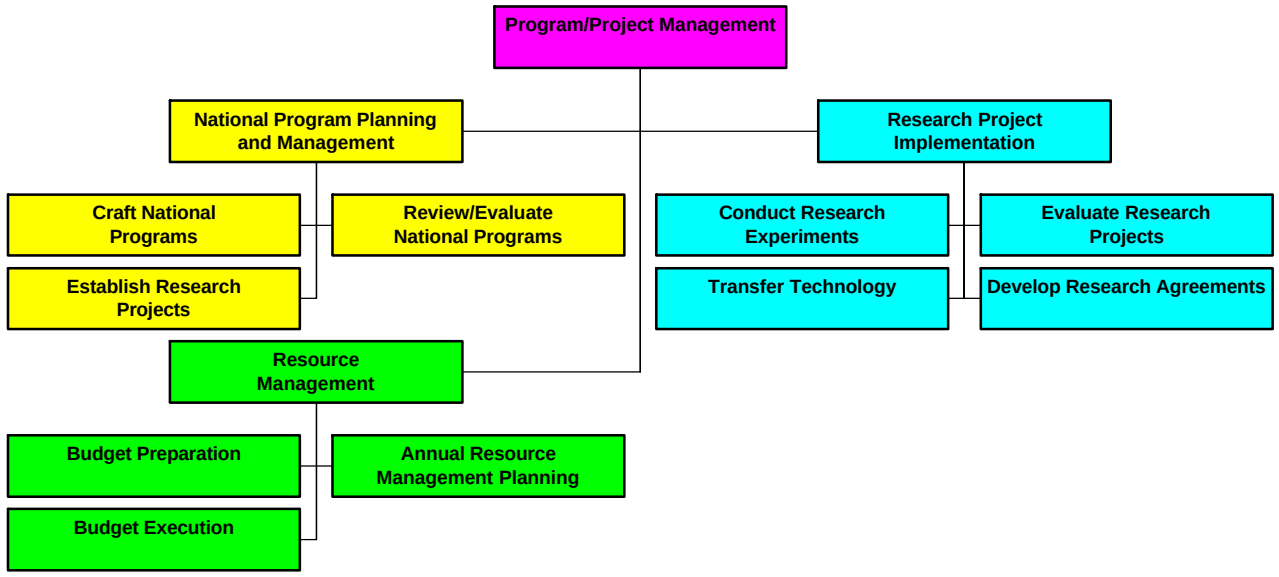
External and internal drivers of ARS program management.

External Drivers	
USDA mission requirements	Action & regulatory agencies - research needs - regulation, compliancy issues - safety and health
USDA Secretary pronouncements	Commodity groups
Congressional intent	Less production research (traditional)
Laws - Acts - (Food Quality Prot.)	Loss of agricultural land
GATT - NAFTA	Smaller #s of producers-bigger farms
Foreign policy	Low profitability of Agr. production
Diminishing political clout	Environmental Impacts(sustain ability and global change)
Emerging food pathogens	Shrinking resources
Emerging diseases	Competition to recruit
Biotechnology impacts	Computer technology (Internet)
Growing population	
Nutrition - consumer	
Market globalization	

Internal Drivers	
Management Philosophy and agenda (flux)	Downsizing - reduce overhead
Accountability (GPRA)	Increase Scientist Years (SYs) with static base with existing resources
High credibility with Congress	Targeted research thrust budget increases (not across the board)
Need to ensure relevance and quality of program	Diversity, discipline mix is changing
National Programs system (more centralized and interdisciplinary)	Flexibility of added responsibilities (changing jobs, training)
Customer-driven research is changing	Anxiety about job and resources
Identity of employees - University vs. ARS	Improve computer technology infrastructure
Workforce diversity	Improve condition of infrastructure (Facilities)
Aging workforce - retirements	

Overview of Major Program/Project Management Processes

The BAA business model of program/project management identifies three major functions performed to manage programs and achieve the mission of the agency:

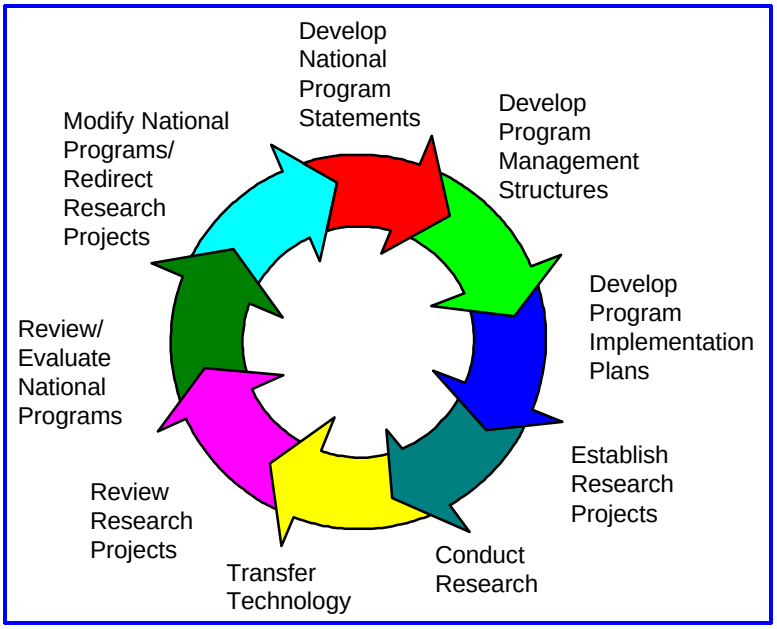


The basic activities performed for Program/Project Management can be represented in a life-cycle, beginning with the creation of National Program concepts and objectives and ending with the completion or evolution of a National Program. For one National Program, a program statement is developed in consultation with Agency customers and stakeholders identifying the major objectives, components, and expected outcomes of the program. A National Program team of scientists and program administrators develops a National Program implementation plan to further define the specific research objectives and performance measures for each component, the problems to be addressed through research, and the activities, time frames and resources to be applied to the National Program. Research project proposals (i.e. CRIS projects) are then developed to accomplish the National Program objectives, reviewed for merit, and then funded and resourced if approved. In this way, the research performed by the agency is guided and designed in accordance with the goals and objectives of National Programs.

Research activities are carried out amongst the National Program team (bench and field scientists, research leaders, etc,) and results are developed, shared, and unified into the National Program framework. Technologies developed through research are transferred to customers as research is conducted and completed. Each research project is periodically evaluated individually for progress and quality, and for relevancy and progress as part of a collection of projects within a National Program or National Program component. Each National Program is periodically reviewed and

evaluated for progress, accomplishments and for continued relevancy to contemporary agricultural research needs and issues. As external and internal changes in science and the environment occur, National Programs are modified and re-focused as needed and the National Program statements, implementation plans, and research projects are adjusted.

The agency communicates the intent and progress of the National Programs with customers and stakeholders throughout the life-cycle, and incorporates the objectives and strategies of the collective programs in the agency budget formulation process. The National Program framework becomes the predominant structure through which ARS communicates the objectives, accomplishments and impact of its research to customers and stakeholders.



The Basic Process Life-Cycle of Program/Project Management

Next Steps

Having completed the fundamental business model of the activities and information involved in Program/Project Management, ARS is now positioned to move forward in implementing new business processes, addressing needed process improvements for those identified by this project, and in developing a strategy to procure or develop key components of a new program management information system that supports the business requirements. In addition, the existing business model can be extended to incorporate additional business functions and information in moving toward enterprise system integration and modernization.

Next steps for continuing the BAA process fall into two categories:

- **Conceptual Business Model and Process Management**
- **Integrated Systems Support for Program/Project Management**

Conceptual Business Model and Process Management

There are four immediate tasks to undertake in improving upon and formalizing the business processes constituting the Program/Project Management business area:

1. Perform process improvements, redesigns, or more complete models for:
    - Peer Review Process for Research Projects
    - National Program Evaluation and Modification Process
    - Research Agreements Planning and Management
    - National Program Team formation and make-up

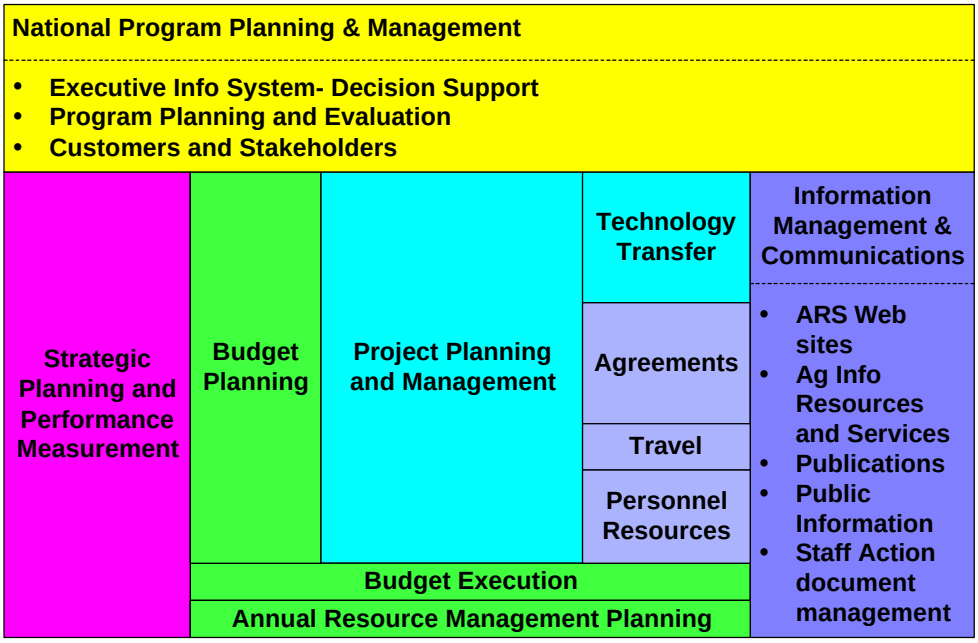
2. Achieve consensus for and verification of the business model developed from a broader and larger audience and Agency leadership. This can be achieved through facilitated workshops or presentations. This should be accomplished prior to any major investments in automated support for the business area.

3. Implement the complete business model once improvements are accomplished and consensus is achieved through policy, direction and training. New procedures should be communicated to agency personnel and managers.

4. Incorporate and expand upon the base model with additional functions and processes and/or additional information in the areas of:
    - Technology Transfer
    - Agreements
    - Resource Management - Staffing

Integrated Systems Support for Program/Project Management

Based on the business model developed for Program/Project Management, the core project team developed an initial concept for a new program management information system to support an integrated framework of business processes and information exchanges among them in the business area. The following graphic illustration of that concept conveys the key components or modules of the information system:



The core project team has identified and recommended the following actions to be taken in acquiring automated systems support for the Program/Project Management business area, in sequential order:

1. Conduct an initial survey of commercially or otherwise available information systems to determine if any is a candidate for possible adoption or modification for ARS use.

2. If an existing system is identified and determined a candidate for procurement or adaptation for ARS, proceed with formal processes for acquisition or procurement and implementation. If no existing systems are viable candidates for ARS use, proceed with investment analysis and project planning for in-house development of a new information system.

3. Depending upon the selection of an existing system or the determination to develop in-house, design and implement a strategy to train and develop ARS information technology staff in the tools and technologies to be used for the new system.

4. Acquisition or full-life-cycle development of the new program management system, based on a modular development and implementation approach.

Tasks, Time Frames and Resources

Recommendations for next step tasks, time frames and resources for Conceptual Business Model and Process Management and Integrated Systems Support are as follows:

Task	Time-frame	People	Dollars	
Conceptual Business Model and Process Management	**8 months**	**Dave Rust, Jenny Clouse co-leads**		
1. Process Improvements/re-designs	Aug. 98 - Dec. 98	Project team and support staff		
2. Consensus for business concepts	Dec. 98 - Jan. 99	Administrator's Council		
3. Implement business concepts	Feb. 99	Administrator's Council and NPS		
4. Incorporate/expand on related areas	Aug. 98 - March 99	Project team and support staff		
			estimated in-house salaries	$93,000
			travel/supplies	$8,000
			Subtotal	**$101,000**
Integrated Systems Support	**20 months +**	**Pamela Mason, Lead**		
1. Survey of commercial/other systems	Aug. 98 - Oct. 98	GSA-FEDSIM		
2. Planning and Investment Analysis - new system	Jan. 99 - Feb. 99	Mason and Consultant		
3. Train and develop IT team	July 98 - March 99	IT team and Technical Contractors		
	8 months			
			estimated contract costs	$135,000
			estimated in-house salaries	$46,400
4. Acquire or develop modular system	March 99 -	IT team and Technical Contractors		
			estimated contract cost - one year	$150,000
	1 year		*estimated salaries - one year*	$483,120
			Subtotal	**$814,520**
			Total	**$915,520**

Total estimated out-of-pocket costs:	$293,000
Total estimated in-house salary costs:	$622,520
	$915,520